NOT FOR PUBLICATION
5230

THE STATUS OF BARK BEETLES OTHER THAN BLACK HILLS BEETLE

FOREST SERVICE REGION 4

November 1964

DIVISION OF TIMBER MANAGEMENT

Forest Service
U. S. Department of Agriculture
Ogden, Utah

THE STATUS OF BARK BEETLES OTHER THAN BLACK HILLS BEETLE

FOREST SERVICE REGION 4

November 1964

INTRODUCTION

This report presents current information on infestations of bark beetles other than the Black Hills beetle Dendroctonus ponderosae Hopk. The purpose of this report is to record the information available on the present status and possible trend of the Sitka spruce beetle Dendroctonus obesus Mann., (until recently known in Region 4 as the Engelmann spruce beetle D. engelmanni Hopk.), Douglas-fir beetle Dendroctonus pseudotsugae Hopk., fir engraver beetle Scolytus ventralis Lec., western balsam bark beetle Dryocoetes confusus SW., Pityophthorus sp. and other miscellaneous bark beetles. The infestations occur on lands of all ownerships in the territory encompassed by United States Forest Service, Region Four, which includes the states of Utah, Nevada, western Wyoming, and the southern two-thirds of Idaho.

While the beetles discussed in this report are presently less destructive than the Black Hills beetle (in previous years often referred to as the mountain pine beetle), they have in recent years destroyed or damaged large numbers of trees.

DOUGLAS-FIR BEETLE

Many thousands of Douglas-fir trees have been killed in recent years by the Douglas-fir beetle throughout the Region Four area. In the years prior to 1963 large "blanket" type infestations covered much of the Douglas-fir type in southern Utah and southern Idaho. Smaller, scattered infestations existed throughout the type in other parts of the Region.

In 1962 an abrupt change in the behavior pattern of the beetle took place in most of the infestations in southern Utah. Bark beetle broods resulting from trees attacked in May of 1961 developed slowly and overwintered in the same trees for two consecutive years. During spring examinations in 1963 most of the broods were found dead underneath the bark, resulting in a drastic reduction of the beetle population. Hence, the beetle flight and number of newly attacked trees was small in 1963 throughout most of southern Utah.

At the same time this reduction took place in southern Utah, a more subtle reduction in Douglas-fir beetle activity occurred throughout the Region. A general decrease in the number of trees attacked was observed throughout northern Utah and most of southern Idaho.

This year due to the low level of the beetle population and the pressing need to concentrate efforts on the Black Hills beetle and spruce budworm, few ground examinations were made. Therefore, the following discussions are based primarily on aerial observations. However, from the few ground examinations made, it appears that the beetles have remained at a low level at least in the areas examined.

Dixie National Forest

Infestations of Douglas-fir beetle have existed in the Douglas-fir stands of the Dixie National Forest for more than a decade. In 1962 over 70 percent of these stands were infested. A sudden reversal in the epidemic trend took place last year. Natural factors nearly eliminated the entire bark beetle population some time between late fall and early spring of 1963. A more complete discussion of the reversal in trend can be found in last year's report.

Ground examinations made this year in areas having past heavy damage confirmed that the beetle population remained at a low level with no increasing tendency.

The Bear Valley infestation, an exception to last year's reversal, appeared to be building up when examined this spring. Brood densities were sufficient (averaging 109 adults per square foot) to cause an increase in the number of infested trees. However, during fall examinations no newly attacked trees were found in the surrounding stand.

In summary, the Douglas-fir beetle on the Dixie National Forest appears to have remained at the low state to which it was reduced in 1963.

Fishlake National Forest

A reversal in the epidemic trend of the Douglas-fir beetle, similar to the decreasing trend on the Dixie National Forest, took place on most of the Fishlake National Forest last year. Prior to this reduction large infestations of Douglas-fir beetle had existed throughout the Fishlake National Forest for a number of years.

The number of newly faded Douglas-fir trees was considerably lower than that noticed in previous years. In many areas where the Douglas-fir beetle has been active for the last few years, little or no new fading was detected during aerial surveys. There are some small localized spots, however, where the fading appeared to be maintaining a 1:1 ratio with the trees killed last year. Aerial detection lags one year behind the Douglas-fir beetle; therefore, it cannot be used to determine the present status of a bark beetle infestation. Unfortunately, time did not permit ground examinations to be made this fall, so the present status of the beetles is not fully known, but it appears that they have remained at a low level.

Ashley, Cache, Caribou, Manti-LaSal, and Uinta National Forests

Aerial surveys on the Ashley, Cache, Caribou, Manti-LaSal and Uinta National Forests indicate that Douglas-fir beetle activity remained at a low level in 1964. However, in some localized areas, the beetle appears to be quite active, and the number of newly faded trees is maintaining a 1:1 ratio with the trees killed last year.

Infestations of Douglas-fir beetle in Logan Canyon on the Cache National Forest appear to have remained at a fairly constant level of severity for the past several years. Most of the infestations are small and located in side drainages high on the canyon walls. Due to the relative abundance of mature and overmature Douglas-fir trees in the area and the high scenic value of the canyon, close surveillance will be maintained so that any sudden change in potential can be quickly reported.

One large group of newly faded Douglas-fir trees exists southwest of South Mountain on the Moab Ranger District, LaSal Division of the Manti-LaSal National Forest. Fall examinations were not made in this infestation, but in all likelihood it will continue through next year.

Fading in Douglas-fir trees in Diamond Creek and in the vicinity of Fifth Water Ridge on the Uinta National Forest appears to have maintained a 1:1 ratio with trees killed last year.

Boise, Challis, Payette, Salmon, and Sawtooth National Forests

During the three years prior to 1962, Douglas-fir beetle populations increased markedly in Douglas-fir stands throughout southern Idaho forests. In many areas populations reached epidemic levels, and considerable Douglas-fir timber was lost annually. Since 1962 a complex of natural factors has exerted an influence on beetle populations, and a decided downward trend has occurred. The 1964 aerial surveys showed that marked reduction in fading in infestation centers continued throughout most of southern Idaho. Some hot spots of activity still exist, however.

The largest area of Douglas-fir beetle activity is on the Sublett Division of the Sawtooth National Forest where the Douglas-fir beetle has been epidemic since 1958. In 1961, a 29,500 MBM sale covering 13,089 acres was made on this Division. The purpose for the sale was twofold: (1) to reduce beetle populations, and (2) to make the stand less susceptible to future beetle attacks. To date, over 9 million board feet of infested and green material have been removed, but in spite of the logging activity the beetle has maintained its epidemic tendencies.

This year's aerial survey detected relatively large groups of faded trees from attacks made in 1963. All observations at this time point toward continued high level of beetle activity on the Sublett Division with further losses expected through next year.

BEETLES INFESTING TRUE FIR

For the past several years, an increase in mortality of true fir trees has occurred throughout the Region. Infestations vary in size from a few acres to hundreds of acres. Due to time limitations and the inaccessibility of some areas, examination of all infestations was not possible.

Toiyabe National Forest

Toiyabe National Forest personnel reported killing of true fir in and around the Bonanza Boy Scout camp on the Charleston Mountain Division, west of Las Vegas, Nevada. Aerial surveys picked up additional groups of faded white fir throughout the District. The majority of the groups are located along the fringes of timber from Macks Canyon to the northern boundary of the District.

Examinations of faded trees showed that some of the fir trees had been killed by attacks of the fir engraver beetle. Many of the trees, however, did not show outward evidence of attack by this beetle. Careful examination disclosed that the fading was not characteristic of bark beetle killed trees. Almost without exception, there was a copious flow of pitch, some of which did not originate from blisters or obvious wounds. By working back into the wood from the origin of the pitch, it was discovered that the fir engraver beetle had made attacks three to five years ago. In some cases only the parent galleries had been constructed, but in others larval mines had been excavated. In all cases the trees had apparently overcome the attacks and had put on annual increments of wood over the wounds. Nevertheless, the wounds had continued to "bleed" and created sufficient pressure to rupture and cause pitch to flow down the bark of the trees. This phenomenon may have been aggravated by the last two years of severe drought. Thus, it appears that these old wounds are causing mortality of fir trees not showing bark beetle mines in the cambium. This condition need further exploration to see if this is the real cause of mortality.

Dixie National Forest

Populations of the fir engraver beetle, Scolytus ventralis Lec. increased to epidemic status in white fir slash on Duck Creek Ridge, Dixie National Forest. Evaluations this past spring showed all slash from three to eight inches d.b.h. was heavily infested. The November evaluations showed slash throughout the thinning area contained epidemic populations of the fir engraver beetle. In addition, many standing, green trees were infested this year when beetles emerged from slash laid down in 1963. There was no indication parasites or predators were causing an unusual amount of fir engraver beetle mortality.

It is our judgment that an increased number of standing, green trees will be attacked next year unless the beetle population is reduced.

A control measure of piling and burning infested slash carried on this fall should greatly reduce the chance of standing, green trees becoming infested next year.

Fishlake National Forest

The large infestation of fir engraver beetle in alpine and white fir stands east of Fillmore, Utah, in Horse Hollow, Dry Canyon, Maple Hollow, and Pine Creek showed no downward trend this year. An estimated 20 to 30 percent of the stand has been killed. Observations at this time point toward continued high epidemic beetle activity next year. Other fir engraver beetle infestations widely scattered throughout this Forest show no signs of decreasing.

Manti-LaSal National Forest

Epidemic infestations of fir engraver beetle have existed in true fir stands on both sides of Fish Creek Ridge and along the side drainages of the Price River, northwest of Price, Utah, for the last several years. Aerial observers report that severe fading in true fir occurred in these areas again this year. It is likely that this infestation will continue next year. Other areas on the forest of known infestations of Scolytus showed additional fading again this year.

Uinta National Forest

A general increase in newly faded true fir trees was observed again this year in Little South Fork and Bennie Creeks on the Uinta National Forest. Light to medium tree mortality occurred east of Mt. Nebo, where the fir engraver beetle has been in existence for several years. In general, the infestations on this Forest resemble the pattern of fading occurring in true fir stands generally throughout the Region.

Humboldt National Forest

For the past three years large groups of true fir trees have been killed on the Snake Division of the Humboldt National Forest. Heavy tree mortality occurred in and near the Wheeler Peak Scenic Area near Lehman Caves National Monument west of Baker, Nevada. In Baker, Pole, and Lehman Canyons as much as 50 percent of the stands have been killed. In adjoining areas, mortality ranges from 10 to 30 percent, some of it occurring in picnic grounds and scenic areas.

Evaluations made in these areas late last fall and early this spring indicated the fir engraver beetle to be one of the causal agents. The samples taken were limited, due to inaccessibility caused by deep snows. Later this spring, the Humboldt National Forest surveyed 3,157 acres to determine the number of infested trees. The survey showed averages of 2.01 Scolytus infested trees per acre, .51 Buprestid beetle infested trees per acre, and 2.79 trees per acre faded but not infested. Since only

two-fifths of the trees showed a current infestation of beetles, it was evident that Scolytus was not the primary causal agent. Proposed suppressive action against Scolytus was canceled. Additional examinations will be necessary to determine more accurately the true causal agent.

SPRUCE BEETLE

In his "Revision of the Bark Beetle Genus Dendroctonus," Dr. Stephen L. Wood determined the Engelmann spruce beetle and several other North American species in reality are one species, Dendroctonus obesus Mann. Therefore, Dendroctonus beetles attacking Engelmann spruce in Region Four are now referred to by this new name.

Bridger National Forest

Populations of spruce beetle Dendroctonus obesus Mann. remained at a low level in the Engelmann spruce stands in the upper Green River area on the Bridger National Forest during 1964. Final treatment of approximately 4,000 downed and standing trees was completed this spring in the Green River Project area, where treating was started in 1955. Approximately 100 windthrown trees are currently infested around the fringes of the old timber sale areas.

Approximately 450 acres of Engelmann spruce slash in timber sale areas on the Bridger National Forest and adjoining Bureau of Land Management lands west of Big Piney, Wyoming, contain epidemic populations of spruce beetle. Timber cutting was conducted during spring and fall of 1962. Most of the slash was piled in windrows and burned during the fall of 1963. Examination of spruce slash showed that spruce beetle broods had developed in the slash last year, emerged and hibernated in the stumps during the winter. Stumps had also been used by the beetles to propagate new brood. Consequently, stumps now contain larvae and pupae, as well as hibernating adult beetles that should emerge next spring. Stumps in all areas, burned and unburned, had active spruce beetle populations.

Unless the beetle broods are destroyed by burning, or spraying with toxic chemicals, it is possible the emerging beetle broods will attack standing, green spruce trees on the Bridger National Forest and on adjoining Bureau of Land Management lands in the areas west of Big Piney, Wyoming.

Dixie National Forest

Last year, aerial observers reported a general increasing trend of spruce beetle activity on the south end of the Aquarius Plateau. Faded trees occurred as scattered singles and groups of three or four faded trees per group. At that time, it was indicated that these small groups could serve as a source for a general buildup of spruce beetle in the area.

Examination of faded spruce trees this year showed a few containing hibernating adult spruce beetles, while in others, the beetles had emerged.

Examination this fall of one- and two-year old stumps showed about 18,500 stumps were infested with epidemic numbers of spruce beetles within Clayton, Griffin Spring, Birch Creek, and Philo spruce sales on the Aquarius Plateau. Slash within these sale areas should not be the cause of any spruce beetle problem if all slash is burned as scheduled before beetle flight next year.

It was estimated that approximately 12,000 two-year old stumps within the Clayton and Birch Creek sales contained epidemic populations of hibernating spruce beetle adults.

Chemical treatment of these stumps was carried out this fall by Dixie National Forest personnel. This should reduce the spruce beetle population in the Clayton and Birch Creek areas to endemic levels.

An additional 7,600 stumps are heavily infested with larvae and pupae of the spruce beetle in the Griffin Spring, Birch Creek and Philo spruce sales. The present populations pose no immediate threat to standing, green trees, since they will not mature, fly, and infest new trees until June and July of 1966.

It is not likely natural factors will reduce the remaining spruce beetle populations before they mature in 1966. Therefore, control action may be necessary next fall to reduce these populations to a low level. This will be determined by ground evaluations.

BARK BEETLES IN PONDEROSA PINE

Dixie National Forest

Throughout the ponderosa pine thinning areas, especially in the Allen Canyon seed reproduction area, bark beetles, of the genus Pityophthorus sp., have built up in the small branches of ponderosa pine slash. Examination this summer showed this slash to be heavily infested with adult beetles. Beetles which emerged last year or early this spring attacked branch tips of standing, green ponderosa pine trees. Branches infested last year are now dead. The number of infested branches varies from approximately one to twenty per infested tree. Beetles present in the slash will probably emerge and attack branches of standing, green trees within the thinning areas this fall. The outbreak will probably continue its present trend through next year.

WESTERN PINE BEETLE

Boise National Forest

In the past three years an increase in the number of faded ponderosa pine has been noted on the Emmett Ranger District, Boise National Forest, Idaho. This year's surveys showed that ponderosa pines were fading in groups of three to five trees from Pine Creek northward to Sage Hen Reservoir. The fading represents an average buildup ratio of three newly faded trees for each one-year old "red-top" tree.

Fall ground checks determined the causal agent to be the western pine beetle Dendroctonus brevicomis Lec. At the present time brood densities average 49.6 per square foot of bark surface. Attacks are mostly confined to mature and overmature age class ponderosa pine.

Bark samples revealed an average of 11 Medeterus sp. per square foot. Also, numerous Clerids and adult staphylinids were recorded. Woodpeckers have also been feeding on the beetle in the infested trees.

In past years the western pine beetle has been recorded to build up in much the same manner throughout the Boise National Forest area, but populations usually start a general decline within three to five years. It is not known at this time if the present situation will follow the pattern of past outbreaks. Biological evaluations will be conducted in the area next year to determine the trend of the western pine beetle. At the present time the potential of the beetle population does not call for urgent control action.

DISCUSSION AND SUMMARY

Outbreaks of bark beetles attacking Engelmann spruce, Douglas-fir, and true fir trees characteristically occur at irregular intervals in Region Four and have caused severe damage. The other bark beetles mentioned in the report usually caused only minor damage in localized spots.

The spruce beetle is presently at a low level in the Intermountain Region. None of the infestations in standing, green trees can be classified as epidemic. However, there is a sizeable outbreak in stumps in old sale areas on the Griffin Top, Dixie National Forest. This infestation threatens to infest the nearby standing trees but control efforts presently being undertaken should substantially reduce the population. Most of the several small outbreaks of spruce beetles infesting stumps in sale areas on the Bridger National Forest and adjoining Bureau of Land Management lands contain epidemic populations that represent a threat to surrounding timber stands.

In general, Douglas-fir beetle activity is down throughout the Region except on the Sublett Division on the Sawtooth National Forest. Logging operations in the infested area have removed a large amount of infested timber; however, the bark beetle population remains epidemic, and will require continuation of the salvage program. Scattered small outbreaks, some of which are in important recreational areas such as Logan Canyon on the Cache National Forest, are still active.

An increase in mortality of true fir trees has occurred throughout the Region, for the past several years. Groups of faded fir trees ranging in size from a few acres to hundreds of acres are scattered throughout the Region. Many of the stands infested play a valuable role in watershed and soil conservation as well as providing timber and enhancing the beauty of scenic areas. The insects believed to be primarily responsible for the damage are the fir engraver beetle, (Scolytus ventralis Lec.) western balsam bark beetle, (Dryocoetes confusus SW.) and Pityophthorus sp. Examinations this year, however, indicate that in some cases, trees are dying from other physiological disturbances. Many trees that died in 1963 and 1964 showed no current bark beetle damage to the cambium, but close examination revealed past Scolytus damage. These trees were probably weakened through successive beetle attacks over a period of years until they finally succumbed. Some of the trees are thought to survive the beetle injury only to fall host to pathological agents or other physiological disturbances that attacked the weakened trees. Closer examinations will be necessary before the primary cause of the mortality can be determined. Some of the mortality is not due to current attack of insects.

Every year on a Region-wide basis the Douglas-fir beetle and the fir engraver beetle kill large amounts of Douglas-fir and white fir trees, respectively. Until a few years ago land managers did not need to concern themselves over small volumes of insect killed timber. However, to meet today's increased multiple use demands for forest resources, protection from insect attack becomes imperative.

Some of the insects mentioned in this report have received little attention in the past. There is much to learn about the life histories and habits of many of these pests before effective control action can be recommended. Sampling methods must be developed before accurate predictions of trend can be made. More research is needed on analyzing evaluation data so that the seriousness and trend of an infestation can be more quickly assessed.

Richard I. Washburn

RICHARD I. WASHBURN
Section Chief

APPROVED: Paul A. Grossenbach

PAUL A. GROSSENBACH
Branch Chief

DATE: Jan 4, 1965

APPROVED: Joel L. Frykman

JOEL L. FRYKMAN
Assistant Regional Forester

DATE: Jan 5, 1965